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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/339,869	06/25/1999	JUN KOIDE	35.C13613	3159

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FITZPATRICK CELLA HARPER & SCINTO
30 ROCKEFELLER PLAZA
NEW YORK, NY 10112

EXAMINER

TUGBANG, ANTHONY D

ART UNIT PAPER NUMBER

3729

DATE MAILED: 09/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/339,869

Applicant(s)

KOIDE ET AL.

Examiner

A. Dexter Tugbang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 June 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3,6-15 and 32-35 is/are pending in the application.
- 4a) Of the above claim(s) 33-35 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3,6-15 and 32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. The applicant's amendment filed on 6/21/05 has been fully considered and made of record.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Election/Restrictions

3. Newly submitted Claims 33-35 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: Claims 33-35 are directed to Figure 7A, Species B, as noted in the Restriction Requirement (dated 7/23/00).

Since applicant has received an action on the merits for the originally presented invention (Species A), this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, Claims 33-35 have been withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Rejections - 35 USC § 103

4. Claims 1-3, 5, 6-13, 15 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Nishiwaki et al 5,263,250, European Patent Publication EP 0 309 146, referred to hereinafter as EP'146, and Japanese Patent Publication JP 2-187346, referred to hereinafter as JP'346.

Regarding Claim(s) 1, 6 and 32, Nishiwaki discloses a method of processing an ink discharge port for manufacturing an ink jet head comprising: closely contacting a mask plate 8 (see col. 5, lines 55-57) having openings corresponding to discharge ports on a discharge port plate 12 with a face of the discharge port plate on an ink discharge side (see col. 4, lines 57+); and forming the discharge port on the discharge port plate of a shape in a discharge direction of the discharge port by irradiating a high energy ultraviolet excimer laser simultaneously through the mask plate so that the laser is inclined with respect to a vertical axis that is perpendicular to the mask plate (see Fig. 3 and col. 5, lines 45-50).

With respect to the wherein clause (last 4 lines of Claim 1 with similar limitations in each of Claims 6 and 32), it is noted that in Figure 4 of Nishiwaki, the discharge port plate is formed through a plurality of respective discharge port positions 40, 41a, 41b, in which each of plural beams are simultaneously irradiated at these “respective discharge port positions” of the discharge port plate and is incident at the single discharge port position from a different direction. The plural beams are also inclined at inclination angles that determine some shape of the nozzle (shown in Figs. 2 or 3 and the discussion at col. 5, lines 15-20).

With regards to Claims 2, 3, 8 and 9, Nishiwaki further teaches that the symmetry of incident beams are clearly symmetrical, have the same angle, and are equally divided with respect to a vertical X-axis (shown in both Figures 2 and 3). Further regarding Claims 3 and 9, Nishiwaki additionally teaches a division of beams that is within a “circumference of a circle” as indicated by the circle in Figure 4.

With respect to Claim 7, Nishiwaki further teaches that the discharging port forming step of forming the discharging ports by irradiating high energy beams simultaneously can be

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performed after the discharge port plate, i.e. nozzle plate, is bonded or fastened to an ink jet main body (see col. 6, lines 64-68).

With respect to Claim 10, Nishiwaki shows (in Fig. 2) that the high ultraviolet beams comprise of at least two beams with each being inclined symmetrically with respect to the vertical X-axis of the mask plate 8 and are incident upon the mask plate in a direction at right angles to an axis along an arrangement direction of the discharge ports. It is noted that the "arrangement direction" can be any direction selected such that it would be at right angles incident from the mask plate.

In summary above, Nishiwaki teaches substantially all of the limitations of the claimed manufacturing method except that the shape of the discharge port is "tapered" such that it decreases in area in a discharge direction of the discharge plate.

JP'346 shows that it is conventional to form a discharge port 11 (in Fig. 9) of the discharge port plate that is tapered in shape and decreases in area in a discharge direction of the discharge port plate. The discharge port is formed by plural beams where each beam is irradiated at the respective discharge port position and each beam is incident at the single discharge port position from a different direction and is inclined at inclination angles that determine the tapered shape.

EP'146 also shows that it is conventional to form a discharge port 13 in a discharge port plate 13 that is a tapered shape that decreases in area in a discharge direction of the discharge plate. EP'146 additionally teaches that plural beams are utilized to form the tapered shape of the discharge port plate. The above process of EP'146 in forming discharge ports with tapered

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shapes has many associated benefits (see col. 5, line 45+), which may be to permit closer spacing of the discharge ports on the discharge port plate or increasing the discharge port volume.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the method of Nishiwaki by forming the discharge port on the discharge port plate with a tapered shape that decreases in area in a discharge direction of the discharge port plate, as taught by both JP'346 and EP'146, for at least the advantages of having the discharge ports closer in spacing with increased volume during operation of the ink jet head.

With respect to Claims 5 and 11, Nishiwaki discloses the claimed manufacturing method as relied upon above, further including that the high ultraviolet beams comprise of at least four beams (see Fig. 2). However, to choose any desired specific angle of irradiation of the incident beams in relationship to the arrangement direction of the discharge port is an obvious matter of design choice, since the applicants have not disclosed that the claimed *angle of 45°* solves any stated problem or is for any particular purpose, and it appears that the invention would perform equally well with the various angles of incident beams taught by Nishiwaki'250, EP'146, or JP'346.

Further regarding Claim(s) 12 and 13, Nishiwaki does not teach that: 1) the ink flow paths are rectangular in shape, and 2) that the discharge port plate is formed by a material of resin.

JP'346 further teaches an ink jet head in which corresponding ink flow paths 14 (in Fig. 9) are rectangular in shape and are connected to a discharge port plate 10. JP'346 teaches that the discharge port plate is made of a resin material, which is ablated by laser beams to form the discharge ports 11, and that the rectangular ink flow paths 14 are formed by the laser beams after

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the discharge ports are formed (see Purpose). An advantage of the above process and material provides the necessary amount of jet-out speed for the ink drops onto a medium, i.e. paper (again, see Purpose).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the method of Nishiwaki by forming the ink flow path rectangular in shape and the discharge port plate with a resin material, as taught by JP'346, to positively provide an operational ink jet head with the necessary amount of jet-out speed for the ink drops onto the medium.

5. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Nishiwaki et al, JP'346, and EP'146, as applied to Claim 6 above, and further in view of Muto'894.

Nishiwaki, as modified by JP'346, and EP'146, discloses the claimed manufacturing method as relied upon above. The modified Nishiwaki method does not teach that the discharge port plate is formed of silicon nitride.

Muto'894 teaches that forming discharge port plates (nozzle plate 61) can be accomplished by conventional, art recognized equivalent materials of either resin or silicon nitride (see col. 25, line 55 to col. 26, line 16). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have formed the discharge port plate of Nishiwaki, alternatively, with such conventional, art recognized equivalent materials with compositions of either resin or silicon nitride, to produce equivalent art recognized discharge port plates.

Response to Arguments

6. It is noted that the applicant(s) arguments (filed on 6/21/05) directed to the limitations of the discharge port being a tapered shape that decreases in area in a discharge direction of the discharge port (as required in each of Claims 1, 6, and 32) is now considered to have been answered and met by the references of JP'346 and EP'146 for the reasons set forth above.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

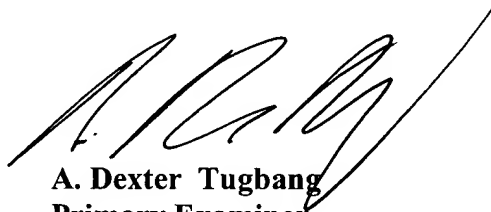
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to A. Dexter Tugbang whose telephone number is 571-272-4570. The examiner can normally be reached on Monday - Friday 8:30 am - 5:00 pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter Vo can be reached on 571-272-4690. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



A. Dexter Tugbang
Primary Examiner
Art Unit 3729

September 16, 2005